

NEXT GENERATION WEATHER RADAR PROGRAM



NEXRAD

OPERATIONAL SUPPORT FACILITY

**WSR-88D EXTERNAL USERS
YEAR 2000 TEST REPORT**

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1.0 EXECUTIVE SUMMARY

The WSR-88D External Users Year 2000 (Y2K) Test was conducted by the OSF on 14-15 June 1999. Participation of WSR-88D external users was voluntary and the test was not related to interface certification. The test was initiated by the OSF as a way to provide Y2K radar data to other computer systems in the WSR-88D network so those that maintain the external systems could perform their own Y2K testing.

Two separate scenarios were executed, each four hours in duration. The first scenario was a crossover from 31 December, 1999, to 1 January, 2000. The second scenario was a crossover from 28 February, 2000, to 29 February, 2000.

No Y2K related anomalies were reported to the OSF by any of the participating external users.

The WSR-88D operational software had previously undergone Y2K testing on several occasions since 1997. The results of that testing can be found in the WSR-88D Software Year 2000 Compliance Test Report.

2.0 INTRODUCTION

The Operational Support Facility (OSF) is responsible for software maintenance and development of the WSR-88D radar network, one of the major components of the National Weather Service Modernization Program. The WSR-88D system is critical to the protection of life and property by providing the forecaster with a tool that can accurately examine severe weather. Each WSR-88D system consists of three separate computer components, identified by their primary function: Radar Data Acquisition (RDA), Radar Product Generation (RPG), and Principal User Processor (PUP). There are several computer systems, external to the WSR-88D system, that ingest radar data through communications lines connected to the WSR-88D computers. This report describes the results of the Y2K testing conducted by the OSF with WSR-88D external users.

The OSF received notification indicating a desire to participate in this test from the following external users:

AWIPS	Advanced Weather Interactive Processing System
NCDC	National Climatic Data Center
NIDS/Kavouras	NEXRAD Information Dissemination Service/Kavouras
NIDS/Unisys	NEXRAD Information Dissemination Service/Unisys
NIDS/WSI	NEXRAD Information Dissemination Service/Weather Services International
RIDDS	Radar Interface and Data Distribution System
RMS	Remote Maintenance System
RRRAT	RDA/RPG Remote Access Terminal
SSM	System Status Monitor
WARP Stage One	Weather and Radar Processor/Harris
WARP Stage Zero	Weather and Radar Processor/Unisys

For the first scenario, WSR-88D system clocks were set to 2200Z on 31 December, 1999. Live radar data was collected and distributed to external users until the clocks reached 0200Z on 1 January, 2000. The second scenario ran from 2200Z on 28 February, 2000, until 0200Z on 29 February, 2000.

2.1 PERSONNEL

The OSF WSR-88D test team consisted of:

Brian Klein	Meteorologist/Software Engineer
Cheryl Stephenson	Software Engineer
Scott Enders	Electrical Engineer

2.2 FACILITIES

There are three possible configurations for a WSR-88D system: NWS/DOD Single (one RDA and one RPG), NWS Redundant (two RDAs and one RPG), and FAA Redundant (two RDAs and two RPGs). This test was conducted using the OSF's FAA Redundant configuration to facilitate the FAA's Remote Monitoring System (RMS). The RMS requires special hardware that, at the OSF, only resides on the FAA Redundant test bed. The test was conducted using Build 10.0 software.

2.3 SCHEDULE

The first scenario (12/31/1999 to 01/01/2000) was conducted 14 June, 1999. The second scenario (02/28/2000 to 02/29/2000) was conducted 15 June, 1999.

3.0 RESULTS

There were no Y2K related anomalies reported to the OSF by the external users.

Communications problems effected the distribution of radar data to two of the external users during the test. The dedicated line between the OSF test bed and NIDS/WSI was intermittent during the first scenario and some products were not received by NIDS/WSI. That connection was more stable during the second scenario. The dedicated line between the OSF test bed and WARP Stage One was down during both scenarios. Trouble shooting the problem from both sides indicated that the cause may have been with the telephone company, however, the problem was never resolved during the test.

In order to get the year 2000 time stamp on the radar products it was necessary to operate with a live radar data feed. Unfortunately, there was no significant weather in the radar coverage area on 14 June so the radar was operated in clear air mode, VCP 32, during the first scenario. This limited the number of products received by some external users. By 15 June, some light rain showers were within range and the radar was operated in precipitation mode, VCP 21, during the second scenario. Again, however, with the lack of strong storms some weather products such as Mesocyclone (M) and Tornadoic Vortex Signature (TVS) contained no storm data.

Although the scenarios were each only four hours long, archive II and III data were collected over a longer period of time. See Appendix A for a listing of the available archive data.

Appendix A - Test Data

These archive II and III data sets were recorded during the test. Copies of the archive II tapes and the archive III optical disk were sent to the National Climatic Data Center for their testing and for distribution to those wishing to perform additional tests.

Scenario 1 Archive II Inventory:

File Name	Date	Volume Scan Start Time
ARCHIVE2.001	12/31/99	19:39:40.6
ARCHIVE2.002	12/31/99	19:45:31.9
ARCHIVE2.003	12/31/99	19:55:19.7
ARCHIVE2.004	12/31/99	20:05:07.7
ARCHIVE2.005	12/31/99	20:14:55.2
ARCHIVE2.006	12/31/99	20:24:43.2
ARCHIVE2.007	12/31/99	20:34:30.9
ARCHIVE2.008	12/31/99	20:44:18.4
ARCHIVE2.009	12/31/99	20:54:07.0
ARCHIVE2.010	12/31/99	21:03:57.2
ARCHIVE2.011	12/31/99	21:13:45.2
ARCHIVE2.012	12/31/99	21:23:33.6
ARCHIVE2.013	12/31/99	21:33:21.8
ARCHIVE2.014	12/31/99	21:43:09.5
ARCHIVE2.015	12/31/99	21:52:57.5
ARCHIVE2.016	12/31/99	22:02:45.5
ARCHIVE2.017	12/31/99	22:12:33.3
ARCHIVE2.018	12/31/99	22:22:22.8
ARCHIVE2.019	12/31/99	22:32:10.8
ARCHIVE2.020	12/31/99	22:41:58.6
ARCHIVE2.021	12/31/99	22:51:46.3
ARCHIVE2.022	12/31/99	23:01:33.9
ARCHIVE2.023	12/31/99	23:11:21.7
ARCHIVE2.024	12/31/99	23:21:11.2
ARCHIVE2.025	12/31/99	23:30:59.0
ARCHIVE2.026	12/31/99	23:40:46.8
ARCHIVE2.027	12/31/99	23:50:34.5
ARCHIVE2.028	01/01/00	00:00:22.7
ARCHIVE2.029	01/01/00	00:10:10.9
ARCHIVE2.030	01/01/00	00:19:58.6
ARCHIVE2.031	01/01/00	00:29:46.4
ARCHIVE2.032	01/01/00	00:39:34.4

ARCHIVE2.033	01/01/00	00:49:22.2
ARCHIVE2.034	01/01/00	00:59:11.5
ARCHIVE2.035	01/01/00	01:08:59.0
ARCHIVE2.036	01/01/00	01:18:47.2
ARCHIVE2.037	01/01/00	01:28:34.9
ARCHIVE2.038	01/01/00	01:38:22.9
ARCHIVE2.039	01/01/00	01:48:10.8
ARCHIVE2.040	01/01/00	01:59:00.9
ARCHIVE2.041	01/01/00	02:08:48.9
ARCHIVE2.042	01/01/00	02:18:36.6
ARCHIVE2.043	01/01/00	02:28:24.2
ARCHIVE2.044	01/01/00	02:38:11.9
ARCHIVE2.045	01/01/00	02:47:59.6
ARCHIVE2.046	01/01/00	02:57:47.6
ARCHIVE2.047	01/01/00	03:07:37.1
ARCHIVE2.048	01/01/00	03:17:25.1
ARCHIVE2.049	01/01/00	03:27:14.6
ARCHIVE2.050	01/01/00	03:37:04.0
ARCHIVE2.051	01/01/00	03:46:51.8
ARCHIVE2.052	01/01/00	03:56:39.8
ARCHIVE2.053	01/01/00	04:06:27.3
ARCHIVE2.054	01/01/00	04:16:15.1
ARCHIVE2.055	01/01/00	04:26:04.3
ARCHIVE2.056	01/01/00	04:35:51.8
ARCHIVE2.057	01/01/00	04:45:39.3
ARCHIVE2.058	01/01/00	04:55:27.1
ARCHIVE2.059	01/01/00	05:05:15.0
ARCHIVE2.060	01/01/00	05:15:03.0
ARCHIVE2.061	01/01/00	05:24:50.7
ARCHIVE2.062	01/01/00	05:34:40.2
ARCHIVE2.063	01/01/00	05:44:28.2
ARCHIVE2.064	01/01/00	05:54:15.7
ARCHIVE2.065	01/01/00	06:04:03.5
ARCHIVE2.066	01/01/00	06:13:53.4
ARCHIVE2.067	01/01/00	06:23:43.1
ARCHIVE2.068	01/01/00	06:33:30.9
ARCHIVE2.069	01/01/00	06:43:20.6
ARCHIVE2.070	01/01/00	06:53:10.1
ARCHIVE2.071	01/01/00	07:02:59.6
ARCHIVE2.072	01/01/00	07:12:49.1
ARCHIVE2.073	01/01/00	07:22:38.7
ARCHIVE2.074	01/01/00	07:32:26.2
ARCHIVE2.075	01/01/00	07:42:14.0

ARCHIVE2.076	01/01/00	07:52:01.7
ARCHIVE2.077	01/01/00	08:01:51.4
ARCHIVE2.078	01/01/00	08:11:38.9
ARCHIVE2.079	01/01/00	08:21:28.5
ARCHIVE2.080	01/01/00	08:31:16.5
ARCHIVE2.081	01/01/00	08:41:06.0
ARCHIVE2.082	01/01/00	08:50:53.5
ARCHIVE2.083	01/01/00	09:00:41.4
ARCHIVE2.084	01/01/00	09:10:30.7
ARCHIVE2.085	01/01/00	09:20:19.7
ARCHIVE2.086	01/01/00	09:30:07.4
ARCHIVE2.087	01/01/00	09:39:54.6
ARCHIVE2.088	01/01/00	09:49:44.2
ARCHIVE2.089	01/01/00	10:00:42.3
ARCHIVE2.090	01/01/00	10:10:31.0
ARCHIVE2.091	01/01/00	10:20:20.7
ARCHIVE2.092	01/01/00	10:30:10.6
ARCHIVE2.093	01/01/00	10:39:58.5
ARCHIVE2.094	01/01/00	10:49:48.0
ARCHIVE2.095	01/01/00	10:59:37.0
ARCHIVE2.096	01/01/00	11:09:26.5
ARCHIVE2.097	01/01/00	11:19:14.2
ARCHIVE2.098	01/01/00	11:29:02.2
ARCHIVE2.099	01/01/00	11:38:51.8
ARCHIVE2.100	01/01/00	11:48:41.1
ARCHIVE2.101	01/01/00	11:58:30.6
ARCHIVE2.102	01/01/00	12:08:18.0
ARCHIVE2.103	01/01/00	12:18:06.0
ARCHIVE2.104	01/01/00	12:27:55.0
ARCHIVE2.105	01/01/00	12:37:44.4
ARCHIVE2.106	01/01/00	12:47:32.4
ARCHIVE2.107	01/01/00	12:57:20.3
ARCHIVE2.108	01/01/00	13:07:09.5
ARCHIVE2.109	01/01/00	13:16:57.5
ARCHIVE2.110	01/01/00	13:26:47.0
ARCHIVE2.111	01/01/00	13:36:35.0
ARCHIVE2.112	01/01/00	13:46:24.4
ARCHIVE2.113	01/01/00	13:56:13.9
ARCHIVE2.114	01/01/00	14:06:03.1
ARCHIVE2.115	01/01/00	14:15:52.6
ARCHIVE2.116	01/01/00	14:25:42.5
ARCHIVE2.117	01/01/00	14:35:32.0
ARCHIVE2.118	01/01/00	14:45:19.7

ARCHIVE2.119	01/01/00	14:55:07.9
ARCHIVE2.120	01/01/00	15:04:55.2
ARCHIVE2.121	01/01/00	15:14:42.9
ARCHIVE2.122	01/01/00	15:24:32.6
ARCHIVE2.123	01/01/00	15:34:22.3
ARCHIVE2.124	01/01/00	15:44:10.8
ARCHIVE2.125	01/01/00	15:54:00.5
ARCHIVE2.126	01/01/00	16:03:50.1
ARCHIVE2.127	01/01/00	16:13:38.3
ARCHIVE2.128	01/01/00	16:23:28.2
ARCHIVE2.129	01/01/00	16:33:18.1
ARCHIVE2.130	01/01/00	16:43:07.8
ARCHIVE2.131	01/01/00	16:52:55.8
ARCHIVE2.132	01/01/00	17:02:45.5
ARCHIVE2.133	01/01/00	17:12:34.9
ARCHIVE2.134	01/01/00	17:22:22.9
ARCHIVE2.135	01/01/00	17:32:10.6
ARCHIVE2.136	01/01/00	17:41:58.6
ARCHIVE2.137	01/01/00	17:51:48.0
END OF SCENARIO 1		

Scenario 2 Archive II Inventory:

File Name	Date	Volume Scan Start Time
ARCHIVE2.001	02/28/00	18:43:48.5
ARCHIVE2.002	02/28/00	18:49:40.6
ARCHIVE2.003	02/28/00	18:55:30.9
ARCHIVE2.004	02/28/00	19:01:22.0
ARCHIVE2.005	02/28/00	19:07:12.1
ARCHIVE2.006	02/28/00	19:13:02.0
ARCHIVE2.007	02/28/00	19:18:52.1
ARCHIVE2.008	02/28/00	19:24:42.8
ARCHIVE2.009	02/28/00	19:30:32.9
ARCHIVE2.010	02/28/00	19:36:23.0
ARCHIVE2.011	02/28/00	19:42:15.1
ARCHIVE2.012	02/28/00	19:48:05.3
ARCHIVE2.013	02/28/00	19:53:55.9
ARCHIVE2.014	02/28/00	19:59:46.7
ARCHIVE2.015	02/28/00	20:05:37.0
ARCHIVE2.016	02/28/00	20:11:27.4
ARCHIVE2.017	02/28/00	20:17:19.1
ARCHIVE2.018	02/28/00	20:23:09.0
ARCHIVE2.019	02/28/00	20:28:58.8

ARCHIVE2.020	02/28/00	20:34:50.3
ARCHIVE2.021	02/28/00	20:40:40.5
ARCHIVE2.022	02/28/00	20:46:31.1
ARCHIVE2.023	02/28/00	20:52:22.8
ARCHIVE2.024	02/28/00	20:58:12.9
ARCHIVE2.025	02/28/00	21:04:03.3
ARCHIVE2.026	02/28/00	21:09:54.9
ARCHIVE2.027	02/28/00	21:15:46.3
ARCHIVE2.028	02/28/00	21:21:38.7
ARCHIVE2.029	02/28/00	21:27:29.0
ARCHIVE2.030	02/28/00	21:33:19.1
ARCHIVE2.031	02/28/00	21:39:09.7
ARCHIVE2.032	02/28/00	21:44:59.9
ARCHIVE2.033	02/28/00	21:50:50.8
ARCHIVE2.034	02/28/00	21:56:41.5
ARCHIVE2.035	02/28/00	22:02:33.2
ARCHIVE2.036	02/28/00	22:08:23.5
ARCHIVE2.037	02/28/00	22:14:13.9
ARCHIVE2.038	02/28/00	22:20:05.4
ARCHIVE2.039	02/28/00	22:25:55.9
ARCHIVE2.040	02/28/00	22:31:46.4
ARCHIVE2.041	02/28/00	22:37:38.3
ARCHIVE2.042	02/28/00	22:43:28.4
ARCHIVE2.043	02/28/00	22:49:18.7
ARCHIVE2.044	02/28/00	22:55:09.3
ARCHIVE2.045	02/28/00	23:00:59.2
ARCHIVE2.046	02/28/00	23:06:50.0
ARCHIVE2.047	02/28/00	23:12:40.2
ARCHIVE2.048	02/28/00	23:18:31.8
ARCHIVE2.049	02/28/00	23:24:23.3
ARCHIVE2.050	02/28/00	23:30:13.5
ARCHIVE2.051	02/28/00	23:36:05.0
ARCHIVE2.052	02/28/00	23:41:55.2
ARCHIVE2.053	02/28/00	23:47:46.6
ARCHIVE2.054	02/28/00	23:53:37.6
ARCHIVE2.055	02/28/00	23:59:28.0
ARCHIVE2.056	02/29/00	00:05:18.6
ARCHIVE2.057	02/29/00	00:11:09.4
ARCHIVE2.058	02/29/00	00:17:00.0
ARCHIVE2.059	02/29/00	00:22:51.1
ARCHIVE2.060	02/29/00	00:28:41.3
ARCHIVE2.061	02/29/00	00:34:31.5
ARCHIVE2.062	02/29/00	00:40:22.1

ARCHIVE2.063 02/29/00 00:46:12.0
 ARCHIVE2.064 02/29/00 00:52:02.0
 ARCHIVE2.065 02/29/00 00:57:52.4
 ARCHIVE2.066 02/29/00 01:03:42.8
 ARCHIVE2.067 02/29/00 01:09:34.6
 ARCHIVE2.068 02/29/00 01:15:24.8
 ARCHIVE2.069 02/29/00 01:21:15.6
 ARCHIVE2.070 02/29/00 01:27:06.4
 ARCHIVE2.071 02/29/00 01:32:57.5
 ARCHIVE2.072 02/29/00 01:39:55.0
 ARCHIVE2.073 02/29/00 01:45:45.7
 ARCHIVE2.074 02/29/00 01:51:36.6
 ARCHIVE2.075 02/29/00 01:57:27.3
 END OF SCENARIO 2

Scenarios 1 and 2 Archive III Inventory:

Disk is ARCHIVE III

NUMBER OF BLOCKS REMAINING ON DISK: 731713

E A R L I E S T		L A T E S T		PRODUCT
DATE	TIME	DATE	TIME	FILE NUM
12/31/99	19:38	12/31/99	20:05	1
12/31/99	20:05	12/31/99	20:44	2
12/31/99	20:34	12/31/99	21:13	3
12/31/99	21:13	12/31/99	21:52	4
12/31/99	21:43	12/31/99	22:32	5
12/31/99	22:13	12/31/99	23:01	6
12/31/99	23:01	12/31/99	23:40	7
12/31/99	23:37	01/01/ 0	00:10	8
01/01/ 0	00:06	01/01/ 0	00:49	9
01/01/ 0	00:39	01/01/ 0	01:18	10
01/01/ 0	01:09	01/01/ 0	01:59	11
01/01/ 0	01:38	01/01/ 0	02:28	12
01/01/ 0	02:28	01/01/ 0	03:07	13
01/01/ 0	03:07	01/01/ 0	03:37	14
01/01/ 0	03:37	01/01/ 0	04:16	15
01/01/ 0	04:06	01/01/ 0	04:55	16
01/01/ 0	04:36	01/01/ 0	05:24	17
01/01/ 0	05:15	01/01/ 0	06:04	18
01/01/ 0	06:04	01/01/ 0	06:43	19
01/01/ 0	06:33	01/01/ 0	07:22	20
01/01/ 0	07:13	01/01/ 0	07:52	21

01/01/ 0	07:42	01/01/ 0	08:31	22
01/01/ 0	08:12	01/01/ 0	09:00	23
01/01/ 0	08:41	01/01/ 0	09:30	24
01/01/ 0	09:30	01/01/ 0	10:00	25
01/01/ 0	10:00	01/01/ 0	10:30	26
01/01/ 0	10:39	01/01/ 0	11:09	27
01/01/ 0	11:09	01/01/ 0	11:38	28
01/01/ 0	11:38	01/01/ 0	12:08	29
01/01/ 0	12:08	01/01/ 0	12:37	30
01/01/ 0	12:37	01/01/ 0	13:07	31
01/01/ 0	13:07	01/01/ 0	13:36	32
01/01/ 0	13:36	01/01/ 0	14:06	33
01/01/ 0	14:06	01/01/ 0	14:35	34
01/01/ 0	14:35	01/01/ 0	15:04	35
01/01/ 0	15:04	01/01/ 0	15:34	36
01/01/ 0	15:34	01/01/ 0	16:03	37
01/01/ 0	16:03	01/01/ 0	16:33	38
01/01/ 0	16:33	01/01/ 0	17:02	39
01/01/ 0	17:02	01/01/ 0	17:32	40
01/01/ 0	17:32	01/01/ 0	17:51	41
02/28/ 0	18:43	02/28/ 0	19:07	42
02/28/ 0	18:47	02/28/ 0	19:30	43
02/28/ 0	19:22	02/28/ 0	19:59	44
02/28/ 0	19:51	02/28/ 0	20:23	45
02/28/ 0	20:20	02/28/ 0	20:46	46
02/28/ 0	20:40	02/28/ 0	21:15	47
02/28/ 0	21:09	02/28/ 0	21:39	48
02/28/ 0	21:19	02/28/ 0	22:02	49
02/28/ 0	21:48	02/28/ 0	22:25	50
02/28/ 0	22:17	02/28/ 0	22:55	51
02/28/ 0	22:52	02/28/ 0	23:18	52
02/28/ 0	23:06	02/28/ 0	23:41	53
02/28/ 0	23:27	02/29/ 0	00:11	54
02/29/ 0	00:02	02/29/ 0	00:34	55
02/29/ 0	00:20	02/29/ 0	00:57	56
02/29/ 0	00:50	02/29/ 0	01:27	57
02/29/ 0	01:24	02/29/ 0	01:51	58
02/29/ 0	01:51	02/29/ 0	01:54	59

End of data, hit Return key to continue.

Sample of archive III products in each volume scan:

Disk is ARCHIVE III

NUMBER OF BLOCKS REMAINING ON DISK: 731713

Opening file : P002

Product Data

Name	Levels	Res	Elev	Date	Time
R	8	.54	0.5	12/31/99	20:14
R	8	1.1	0.5	12/31/99	20:14
R	8	2.2	0.5	12/31/99	20:14
R	16	.54	0.5	12/31/99	20:14
R	16	1.1	0.5	12/31/99	20:14
R	16	2.2	0.5	12/31/99	20:14
V	8	.27	4.5	12/31/99	20:14
V	8	.54	0.5	12/31/99	20:14
V	16	.13	0.5	12/31/99	20:14
V	16	.27	0.5	12/31/99	20:14
V	16	.54	0.5	12/31/99	20:14
SW	8	.13	0.5	12/31/99	20:14
SW	8	.27	0.5	12/31/99	20:14
SW	8	.54	0.5	12/31/99	20:14
DHR				12/31/99	20:14
HSR				12/31/99	20:14
CR	8	.54		12/31/99	20:14
CR	8	2.2		12/31/99	20:14
CR	16	2.2		12/31/99	20:14
ET				12/31/99	20:14
SWP				12/31/99	20:14
VWP				12/31/99	20:14
SRM			0.5	12/31/99	20:14
VIL				12/31/99	20:14
STI				12/31/99	20:14
HI				12/31/99	20:14
M				12/31/99	20:14
TVS				12/31/99	20:14
SS				12/31/99	20:14
LRM				12/31/99	20:14
LRM				12/31/99	20:14
APR				12/31/99	20:14
OHP				12/31/99	20:14
THP				12/31/99	20:14
STP				12/31/99	20:14
DPA				12/31/99	20:14

SPD		12/31/99	20:14
RCM		12/31/99	20:14
VAD	0.2	12/31/99	20:14
CS	0.5	12/31/99	20:14
LRM		12/31/99	20:14
Stat		12/31/99	20:15

Appendix B - Acronyms

AWIPS	Advanced Weather Interactive Processing System
DOD	Department of Defense
FAA	Federal Aviation Administration
NCDC	National Climatic Data Center
NEXRAD	Next Generation Weather Radar (WSR-88D)
NIDS	NEXRAD Information Dissemination Service
NWS	National Weather Service
OSF	Operational Support Facility
PUP	Principal User Position
RDA	Radar Data Acquisition
RMS	Remote Maintenance System
RPG	Radar Product Generation
RRRAT	RDA/RPG Remote Access Terminal
SSM	System Status Monitor
WARP	Weather and Radar Processor
WSI	Weather Services International, Division of Litton Corporation
WSR-88D	Weather Surveillance Radar - 1988, Doppler (NEXRAD)
Y2K	Year 2000
Z	Zulu Time (Greenwich Mean Time)